166 hsien.[14] The few rural dwellers who moved from the townships surveyed went to the larger cities or to the east coast. Two townships on the east coast showed a relatively large immigration[15] during the period 1937-52; most of the newcomers were from the western and southern parts of the island. If employment opportunities in the urban areas are improved, it is believed that there will be a great migration from every township.[16]

In recent years, industrialization has been another factor which influenced a number of people to move from rural areas to urban and industrial areas. Cities having more than 100,000 inhabitants in 1920 accounted for 4 per cent of the total population; while in 1952, large cities accounted for 21 per cent. If we consider that the increase in total population during 1920-52 was 120 per cent -- 3,800,000 to 8,200,000 -- the increase in urban population which amounts to more than 420 per cent is of extreme importance and indicates how rapidly urbanization is taking place in Formosa.

VI. VITAL STATISTICS

•163 ### A. Births

The birth date of Formosa has been constant and high. During the period 1920-53, the number

14. Ibid., p. 205; the remaining 13 per cent are probably from other hsien and provinces.
15. Raper, loc. cit.
16. Ibid.

Table 7. Births According to Age of Mother, 1950-52 */
(per 1,000)

Year	All Ages	Under 15	15-19	20-24	25-29	30-34	35-39	40-44	45 +
1950	143.2	0.1	60.9	245.0	295.3	266.9	191.5	110.9	29.4
1951	168.0	0.1	67.7	287.1	349.5	310.9	225.9	131.8	34.6
1952	158.5	0.1	53.1	271.8	341.7	293.8	219.9	113.4	29.3

*/ United Nations, Statistical Office, Demographic Yearbook, 1953, New York, 1953, pp. 144-45.

45:Stanford U. S-4, 5 1956 AD 1 Formosa ADL

• /63 of births per 1,000 population has remained over 40, except in the year 1948 when the rate was 39.7.

•163 In the prewar years, the birth dates were found to be lower in the northern and central parts of the island; higher rates prevailed in the southern and eastern districts.[17] Exactly the same tendency exists today, according to a study of sixteen townships made by the Joint Commission on Rural Reconstruction.[18]

General fertility ratios for the Taiwanese in 1930, 1935, and 1940 were estimated at 204, 215, and 206 (births per 1,000 women 15 to 49 years of age).[19] In the twelve months ending in September 1952, the sixteen townships studied by the Joint Commission[20] had a fertility ratio of 290 for every 1,000 women between the ages of 15 and 45. Mothers 25 to 29 years old are the most prolific. But, as a whole, Taiwanese women do not avoid the risks relative to frequent pregnancy and childbirth.

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17. George Barclay, Colonial Development and Population in Taiwan, Princeton University Press, 1954, p. 249.
18. Raper, op. cit., p. 196.
19. Barclay, op. cit., p. 243.
20. Raper, loc. cit.

matrix could easily have reduced death rates to 12 or 15 per 1,000 total population and, if birth rates had remained at 45, shot the rate of natural increase from 2.5 per cent per year to 3.0 per cent or more. 165 563

THE BIRTH RATE

Neither the extension of cultivation, the increase of yields nor the health and medical activities in Taiwan produced any major changes in the familial patterns of the peasants. The recorded birth rate of the Chinese remained above 40. There were some slight evidences of a lower birth rate in the more prosperous and urbanized provinces, but the social and occupational groups that might have adopted the modern individual and familial values, rather than the traditional Eastern values, were few in numbers. 163

The growth implicit in the maintenance of fertility at the level that existed in Taiwan during the last decade of Empire was indeed rapid. The gross reproduction rate for the entire population was over 3.2 and the net rate over 2.0.

It is obvious that no population dependent on agriculture and inhabiting a limited and already densely settled area could reproduce indefinitely at the rate implicit in these figures. Potential growth was more rapid than the actual growth of the thirties, though, for any social and economic changes that would improve levels of living and contribute ultimately toward a reduction in fertility would produce immediate and more rapid declines in the death rate.

THE PROSPECTS: PREWAR JAPANESE VIEW

The balance between the people and the land in prewar Taiwan may have appeared precarious to the Western student but the Japanese foresaw many decades of further expansion before the Malthusian pressures of the people on the food supply would limit either population growth or exportable surpluses. Rice production had increased from 2.1 million koku in 1900 to 4.9 million in 1923 and 9.7 million in 1940. In the latter year the export surplus amounted to five million koku. By 1956 rice production would amount to 12.8 million koku and the quantity available for export to Japan Proper would increase by almost a million koku. 433 241 439

The Japanese also realized that Asian hegemony implied a destiny beyond the agrarian for the once subject peoples and that Japan's own demographic

48: Chen E-4 (no date) 1955 ADI Formosa ADI

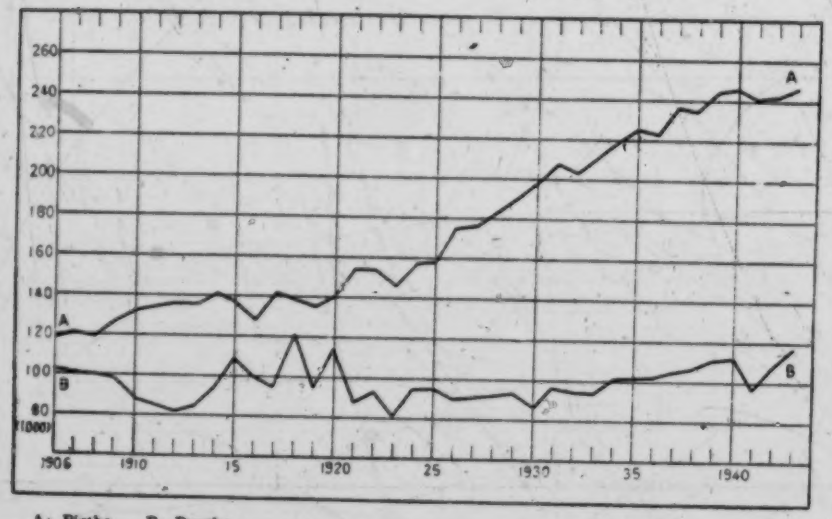
century and a half, and will attain the figure of present world population within two and a half centuries (1: p. 13; 2: p. 45; 4: p. 73-74). As a matter of course these suppositions assume that the present conditions will continue, and that a change of conditions will cause population growth to show another aspect. With regard to the estimation of future population, Sun-Ken Quo has a different point of view based on a different perspective (3).

5: The Cause of Population Growth.

Natural increase and immigration are two causes of population growth. Since the colonial government strictly controlled the emigration of Taiwanese to the mainland and the immigration of mainlanders to Taiwan, migration was quite insignificant for the population growth of Taiwanese, and 96% of its total growth was the result of natural increase[4].

Now, how was this natural increase achieved? From Figure 1 we can see that between 1906 and 1943 the annual number of deaths of Taiwanese did not show any remarkable change, it remained around one hundred thousand. In contrast with this,

Fig. 1: Number of Births and Deaths of Taiwanese, 1906-1943



A: Births B: Deaths

Source, 14: Table 96

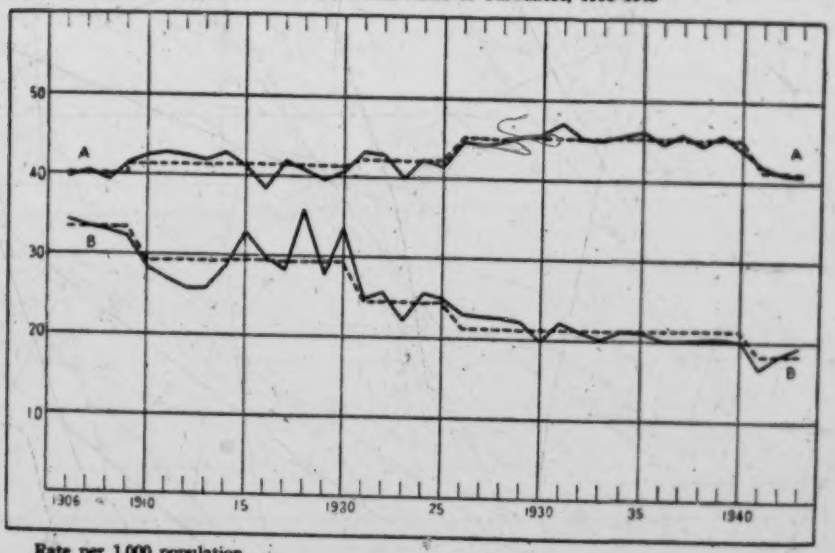
Note 4: The total of the annual increase of Taiwanese population between 1906 and 1943 was 3,078,406 (14: Table 49, 3). (The Taiwanese population in 1905 was 3,055,461, the increase between 1906 and 1943 was 3,078,406, and the grand total of these two figures, 6,133,867 was the Taiwanese population in 1943. 14: Table 49, 2. cf. Table 1, A, column 11 of this paper). Total of the annual natural increase of the Taiwanese between 1906 and 1943 was 2,947,998 (14: Table 96) was 95.76% of the total increase. Total annual increase other than natural increase of the same period was 130,408, and occupied only 4.24% of the total increase.

48: Chen E-4 (no date) 1955 AD1 Formosa AD1

163 the number of births has increased markedly, it was around 120 thousand by 1906, it
165 had doubled to around 240 thousand by 1943. The number of deaths remained about the same and the number of births was doubled; this was the cause of Taiwanese population growth.

161 Analyzing the rates of birth and death, the situation will be clearer and easier to grasp. Though the number of births was doubled between 1906 and 1943, the birth
163 rate remained almost the same, around 40 per thousand. Though the birth rate has remained the same, the number of births has increased in accordance with the increase
165 of population. Despite the annual increase of population, the number of deaths has remained almost unchanged. This indicates a decline in the death rate (cf. Fig. 2). The death rate of Taiwanese was 34.4 per 1,000 in 1906, it dropped to 18.4 per 1,000 by 1942, a decline of 16 per 1,000. The birth rate remained almost the same and death rate dropped 16 per 1,000. This is the cause of Taiwanese population growth. The result is clearly shown in the amount of natural increase. The space between line A and line B of Figure 1 represents the amount of natural increase, and the space between line A and line B of Figure 2 represents the rate of natural increase (cf. Table 3). Decline of death rate was the key factor of the Taiwanese population change during the half century under Japanese rule.

Figure 2: Birth and Death Rates of Taiwanese, 1906-1943



Rate per 1,000 population

A: Birth rate B: Death rate (The dotted lines represent the average rate of each period.)

Source, 14: Table 64

6. Population Change and Social Change.

From Figure 2 we can observe the trend of the death rate between 1906 and 1943. The graph naturally divides into five periods each with its characteristic type of change

48: Chen E-4 (no date) 1955 ADI Formosa ADI

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as indicated in Table 3. The birth rate also shows the same periodical tendency. It is very significant that there is an intimate interrelation between population change and social change in each period, and we even may infer that population change is the index of social change. This will be analyzed in subsequent sections. The average rates of birth, death, and natural increase (Table 3) and main features and changes of each period will be clear from the following table.

161 178

Table 3: Five Periods of Taiwanese Population Change.

Period	I	II	III	IV	V
Years	1906–09	1910–20	1921–25	1926–40	1941–43
Number of years	4	11	5	15	3
Average Birth Rate (per 1,000)	40.25	41.40	42.08	45.24	41.10
Average Death Rate (per 1,000)	33.35	29.37	24.61	21.20	18.23
Average Rate of Natural Increase, (per 1,000)	6.90	12.03	17.47	24.04	22.83

First Period (before 1909): Wide spread epidemics and malaria, frequent revolts of the people against the Japanese characterize this unstable period. The birth rate was high (more than 40 per 1,000), but the death rate also high, more than 30 per 1,000 on an average, and the fluctuation was remarkable and frequent. The rate of natural increase was about 7 per 1,000.

Second Period (1910–1920): Epidemics were wiped out by the end of this period, the prevention of malaria had started. The uprisings of the Taiwanese were suppressed around 1915, the revolts of the aborigines were largely mitigated by 1920, and comparative social stability was more or less attained. Political, cultural and social movement of the modern type began for the first time after World War I, and took the place of armed uprising. The Japanese colonial policy had changed somewhat. Birth rate increased slightly, death rate declined to an average of around 30 per 1,000, and the rate of natural increase rose to 12 per 1,000.

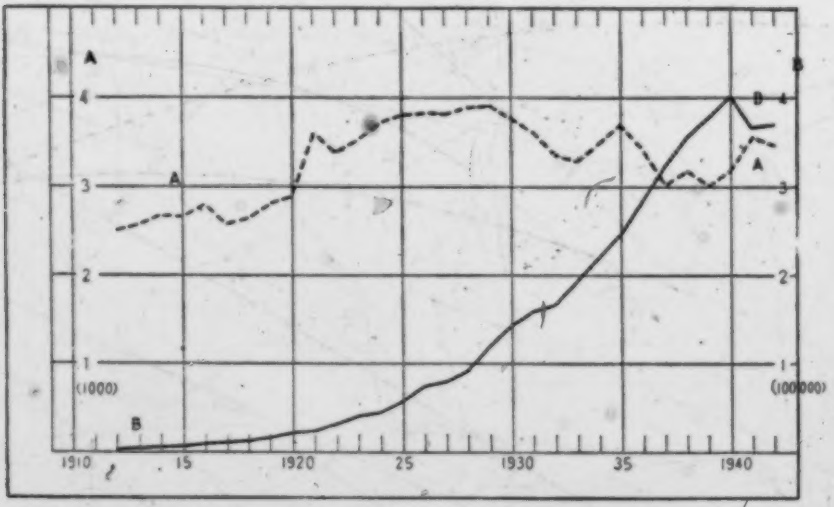
Third Period (1921–25): Vigorous cultural and social movement marked this era. This was a period preparatory to the following period of expansion. Transportation was improved, mobility of people increased. Agricultural products and processed agricultural products increased, the productivity was raised, and the consumption of daily necessities increased slightly. The attitude of the people began to change, they began to adopt new ways of life more readily. Use of mechanical facilities gradually increased, and the number of doctors of western medicine exceeded the number of physicians who practiced Chinese medicine. The spread of primary education was promoted. The birth rate increased again, the death rate was 4.8 per 1,000 lower than the foregoing period, and the rate of natural increase rose 5.5 per 1,000.

Fourth Period (1926–40): During this period there was a tremendous increase in the output of agricultural products, attaining the peak production during the Japanese rule. The hydroelectric plant of Sun Moon Lake was completed in 1934, and industry

48: Chen E-4 (no date) 1955 AD1 Formosa AD1

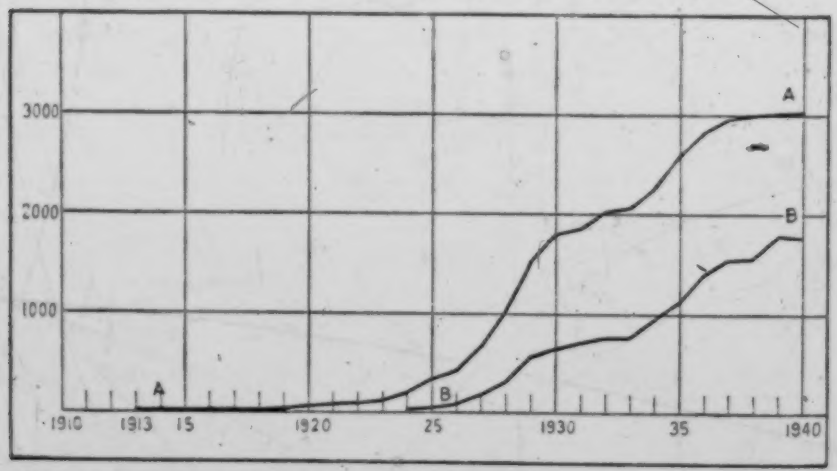
During the early years of Japanese occupation, the difference in the rates of birth and death in different localities was remarkable. As time passed, the development of different localities was gradually equalized, so the

Fig. 4 Number of Rickshaws and Bicycles, Taiwan, 1912-1942



A: Rickshaws (unit: 1,000) B: Bicycles (unit: 100,000)
Source, 14: Table 457

Fig. 5 Number of Automobiles and Trucks, Taiwan, 1913-1943



A: Automobiles B: Trucks
Source, 14: Table 457, 455

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rates of birth and death were more and more equalized. The difference between the highest and the lowest birth rate among different localities was 13.4 per 1,000 in 1906, but had fallen to 8.5 per 1,000 in 1935; the difference between the highest and the lowest death rate among different localities was 32.6 per 1,000 in 1906, but it was only 8.9 per 1,000 in 1935 (see Table 4, cf. 1: p. 169).

Table 4: The Highest and the Lowest Birth Rate, the Highest and the Lowest Death Rate of Different Prefectures of Taiwan in Selected Years (Rate: per 1,000 population)

		1906		1935				1906		1935	
Birth Rate		Whole Province	39.3	Whole Province	45.2	Death Rate		Whole Province	34.0	Whole Province	20.5
	The Highest	Nanto Prefecture	47.7	Tainan Prefecture	48.1		The Higheat	Chiai Prefecture	52.9	Taitung Prefecture	24.4
	The Lowest	Yansuika Prefecture	34.3	Taipei Prefecture	29.6		The Lowest	Hsinchu Prefecture	20.3	Penghu Prefecture	15.5
	Differece		13.4		8.5		Difference		32.6		8.9

Source: 10:1906, 1935.

13. *Agriculture and Industry*

To get primary agricultural products and processed agricultural products, especially rice and sugar, which Japan needed urgently, was one of the main policies of Japan in Taiwan. The colonial government had spent much of time and money for the promotion of the production of rice and sugar. They made various kinds of surveys, researches, and experiments, used the system of police and pao-chia for enforcement, and as a result, the outputs of rice and sugar had increased tremendously.

Among the various types of production in Taiwan, agriculture and manufacturing were the two main types, and the proportion occupied by forestry, fishery, and mining was rather small. In 1912, the value of the total output of all types of production amounted to 146,374 thousand yen. Among these, the proportion of agriculture was 63%, manufacturing was 32%, and the total of three other types (forestry, fishery, and mining) was only 5%. By 1942, manufacturing had developed fairly well, its production value had exceeded that of agriculture. The value of the total output of all types of production in 1942 was 1,515,627 thousand yen. Agriculture's share of this was 42%, manufacturing was 46%, and the total of three other types was 12%. Agriculture and manufacturing, the two main types of production, were again represented by rice and sugar respectively. The proportion of the value of rice to the total value of agricultural products was 59% in 1912, and 39% in 1942. The proportion of the value of sugar to the total value of manufactured products was 79% in 1912 and 42% in 1942. Considering these facts, it seems not unproper to take rice and sugar as representative of Taiwan production.

From figure 6 we can see, that in comparision with the increase of acreage of cultivation (line A), the increase in the output of rice (line B) was tremendously high.

52:Barclay S-5 (nodate)1954 AD1 Formosa AD1

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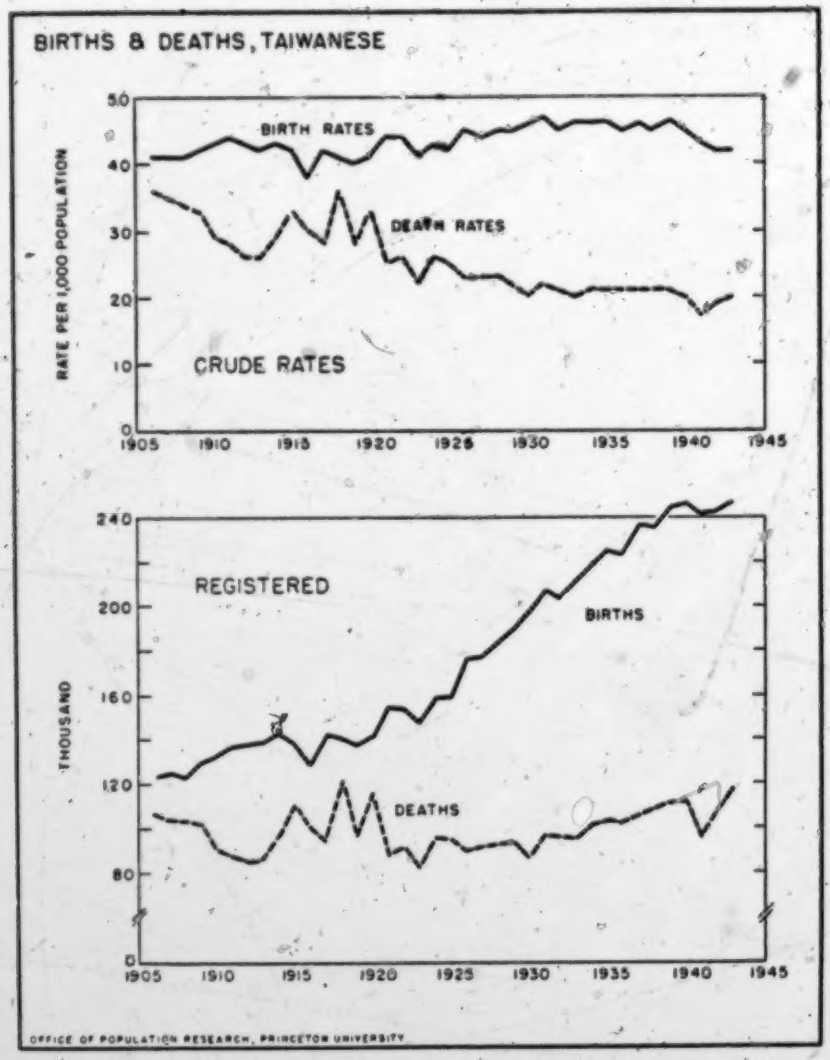

Fig. 21. Crude Birth and Death Rates and Total Registered Births and Deaths of Taiwanese, 1906-1943.

for it allows one to speak in terms of probabilities of dying, which is what we mean here by the notion of mortality. Being conventional, it lends itself easily to comparison with data from other places independent of differences in age structure, even when the procedures of computation are slightly varied. Some caution, of course, must be

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52:Barclay S-5 (no date)1954 ADI Formosa ADI

161 enough range of social functions is carried on in family units, individuals cannot readily participate in the society except as family
182 members. Their contacts with the rest of the society may come to depend on ties of kinship, lacking provision for being conducted on other terms.

Familial institutions have always been one of the most prominent elements in Chinese society. The culture of China is dominated by a morality that systematically urges and abets the production of progeny. We have already seen the by-products of this situation among the Taiwanese. The organization of livelihood, the inheritance of occupation, the immobility of the rural population and the character of migration to cities all reflected the influence of family relationships in the decisions of individuals.

At the same time, events under Japanese rule undeniably altered many of the conditions of life in Taiwan. In fifty years of selective exposure to modern innovations, Taiwanese were showing the effects of this contact, though none of these effects—except the gains in longevity—could be called spectacular. It now remains to be seen whether these developments had created more than superficial social changes, and had begun to exert any influence on fertility.

The Course of Fertility in Taiwan

163 Due to its peculiar nature in Taiwan, the system of vital registration recorded the numbers of Taiwanese births with a high standard of accuracy. Births were registered by the same system as were deaths, which has been described in some detail in Chapter VI. It functioned as part of a more comprehensive scheme of control; this scheme in turn owed its effectiveness to the ingenious way that it was fitted into local solidarities and backed by police power. Since the system recorded deaths accurately and since the figures it helped to compile in census enumerations were practically complete, the tests illustrated in Chapter VI indicate that few live births went unregistered.

By this token the data for births are nearly as valid as were the figures for deaths. In other respects, however, they are less adequate. It is not enough for the study of fertility to know the numbers of births that occurred. The significant event is in reality parenthood rather than the birth itself—we do not search for the motives of a child in entering the world, but of its parents in bringing about the event. Accordingly, some information is needed about the circumstances of birth, and in particular about the characteristics of parents. Though Taiwan's Research Bureau issued copious data each year

52:Barclay S-5 (nodate)1954 AD1 Formosa AD1

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in its regular report on vital statistics, no direct information of this sort was published. Births were tabulated simply by the civil division in which they occurred. The few other characteristics that were shown did not include any usable information about parents.[a]

Japanese showed no interest in taking advantage of their excellent birth statistics in Taiwan. Their failure to do so all but precludes any detailed study of the nature of fertility in this society, for it has denied us the information that might reveal some of the motivations surrounding parenthood. Since many of the relevant details are lacking from published sources, we shall have to fall back on approximations to conduct the sorts of measurements that will have some meaning in comparison with other countries.

"Fertility" is usually defined less precisely than mortality. Records

TABLE 74
CRUDE BIRTH AND DEATH RATES OF TAIWANESE, 1906-1943, AND RATES OF NATURAL INCREASE*

Years	*Births per Thousand Persons*	*Deaths per Thousand Persons*	*Natural Increase per Thousand Persons*
1906–10	41.7	33.4	8.3
1911–15	42.9	28.6	14.3
1916–20	40.4	31.0	9.4
1921–25	42.8	25.0	17.8
1926–30	45.0	22.1	22.9
1931–35	46.0	21.2	24.8
1936–40	45.4	20.6	24.8
1941–43	42.1	18.5	23.6

* Figures here are unweighted averages of annual birth and death rates for each year. Before 1915, births and deaths have been adjusted slightly on the basis of the internal pattern of infant mortality in later years. Otherwise no allowance has been made for under-registration.

Source: *Statistical Summary*, Table 64.

[a] The vital statistics did contain tables of births by occupation of parent, but the standards of classification were different from those used in the census (though the categories were the same), and did not receive much care in compilation. Similarly, tables were published purporting to show whether or not births were legitimate, but these cannot be relied upon to indicate the actual marital status of parents, because the Japanese did not recognize marriages that were not legally registered. Basic demographic data like the ages of mothers and actual marital status were never published.

On the credit side, the tables of births by place of occurrence were reliable, and were not noticeably affected by arbitrary allocations to other places or the migration of pregnant women just before childbirth, as in Japan. (See Taeuber, I. B., and Beal, E. G., Jr. [October 1946], pp. 17-18.) It should be noted that even this advantage did not hold for Japanese in Taiwan. Some of their births were recorded in Taiwan, and some allocated to the legal residence of their families in Japan, making it almost impossible to estimate fertility or infant mortality of Japanese in Taiwan.

52:Barclay S-5 (nodate)1954 AD1 Formosa AD1

163 of births are kept primarily as records of the persons being born, whereas for purposes of measurement we have seen above that they must be viewed in relation to some population of actual or potential parents.[4] When the ages of mothers have not been specified, for example, arbitrary procedures have to be adopted for deciding which women might have been parents. There is consequently more latitude in devising measures to express the level of fertility than of mortality. Each different convention that is adopted bears some different significance.

The simplest expression for fertility is the births of each calendar year per thousand total population, or crude birth rate. By including everybody in the denominator, it avoids most of the problems that arise with more complex measures.[5] Table 74 summarizes the trend of crude birth rates for Taiwanese. Crude rates are useful in showing the balance of the two in changes of population size, for they place births on the same footing as deaths. In contrast to their death rates, Taiwanese crude birth rates scarcely changed in almost forty years. In a sense, therefore, the rates of natural increase rose almost solely because of decline in mortality; but they would not have risen to their high level in Table 74 if crude birth rates had not remained nearly constant at between 40 and 50 per thousand.

These data show no tendency for fertility to fall along with death rates. Quite to the contrary, birth rates actually rose slightly over the period. Crude birth rates, however, have a well-known property of indicating trends that are spurious, due to changes in age composition of the population. Before attaching much significance to these minor movements of rates, one should first examine the evidence of more precise indices of fertility.

[4] Moreover, as events occurring to adults, births are more complex in their distribution than deaths. A birth can happen more than once to any one parent, as death cannot, and introduces at least one more possible dimension for measurement.

[5] Use of crude birth rates does not avoid all of these problems. (It also creates new ones, as indicated below in the text.) Usually part of the births of a given year are included in both terms of the rates.

More important, however, is another difficulty which all measures share equally. Birth itself is not so definite an event as death. In societies where infant mortality is high, it is next to impossible to determine exactly what is a "live" birth. In Taiwan we have seen this problem illustrated in the case of unregistered non-survivors—babies who were perhaps born alive but died in the first few hours or days of infancy. Some of these may have been listed as stillbirths in the statistics, but an unknown number were probably omitted completely. Hence any measure of fertility based on these figures is certainly in some degree an understatement. Aside from the adjustment of births made before 1915, we must accept the figures of "live" births as they were published, with only minor adjustments to bring them into line with the numbers of children counted in the census.

52:Barclay S-5 (nodate)1954 ADl Formosa ADl

THE FERTILITY OF THE TAIWANESE

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Trends in fertility can be better approximated in terms of childbearing by potential mothers. In countries where this information is known, practically all women who become mothers do in fact have their births between ages 15 and 50. General fertility ratios, or total births per thousand women in this age interval, give a better idea of actual trends among women who might have become mothers. The first column of Table 75 shows a series of such ratios centered around

TABLE 75
GENERAL FERTILITY RATIOS FOR TAIWANESE, 1905-1940
Births per 1,000 Women 15-49, Based on Three Separate Estimates of Births

Year	*Births Registered During Census Year*	*Three-Year Average of Registered Births, Centered Around Census Year*	*Births Estimated From Infants Counted in Census*
1905	170*	170†	188‡
1915	179	176	188
1920	174	177	184
1930	199	200	204
1935	209	206	215
1940	203	201	206

* This is the value actually computed for 1906.
† Represents the unweighted average of ratios for 1906 to 1909.
‡ Births estimated by adding to infant survivors the deaths implied by the infant death rate in each calendar year.
Sources: Vital Statistics Reports for each year involved; tables of population by age and sex from each census, and special tables of infants by month of age.

census years. It is based on the births as registered, just as were the crude rates in Table 74. These ratios make the apparent rise of fertility seem just as prominent as when based on the evidence of crude birth rates. Neither index is conclusive, for there is reason to suspect omission in the early birth registration.

There is available still another resource, one that is not impaired by defective birth reporting in the early years. Through the combination of Chinese consciousness of age and careful Japanese census procedures, enumerations of infants at each census year were more complete in their coverage than birth registration.* Since the census was always taken on the first day of October, the Japanese scheme

* They have been invaluable, in fact, in testing the adequacy of birth registration for small civil divisions in later census years. This information was omitted in the tabulation of one census, that of 1925.

for allocating age (by calendar year of birth) gave an age interval for infants representing only three-fourths of a full year's births. Recognizing this shortcoming, census authorities tabulated full information on infants by month of age and published supplemental tables with all enumerated infants born since October 1 of the preceding year.[7] These tables make possible an estimate of births in each of the early census years that is nearly independent of the bias in the registration system. Given thorough enumeration, it should hence be consistent over time and not exhibit as increasing fertility what was in fact improvement in registration.

The last column of Table 75 gives general fertility ratios based on these special enumerations at each census. Here the infants have been used to estimate births occurring over the preceding year. For this estimation we have assumed that the births preceding the census date were affected by mortality conditions that prevailed during the calendar year of the census.[8]

These figures represent the trend of fertility in Taiwan more dependably than crude birth rates. Far from declining in the slightest, these ratios of all adult Taiwanese women evidently *increased* slightly. The fertility ratios based on census infants show that the rise before 1920 was probably a matter of improvement in registration, for infants were so carefully enumerated that they could not have been over-counted. On the other hand, the numbers of census infants counted at any one date may reflect an extraordinary crop of births in the preceding year. This was apparently the case in 1935. Taken separately, that year yielded the highest observation for fertility. Averaged with adjacent years it produces a value that is less extreme, and more appropriate to use in estimating the trend. (The same interpretation does not apply to the discrepancy between the single-year ratio and the 3-year ratio for 1915; here births were exceptionally low in 1916, possibly in reaction to an outbreak of malaria in 1915. To judge from the large number of deaths among potential mothers in that year, they must have been heavily affected by the disease.)

[7] As for validity, these show consistency of age reporting even by single months when tested against births by month of occurrence. The same tables continued to be published after 1930, when the age system above infancy was changed.

[8] Specifically, that the calendar-year infant death rate is a true mortality rate. The calculation is based on the life-table term l_1, converted to L_0 by the arbitrary weights $.28\,l_0 + .72\,l_1$ for males and $.29\,l_0 + .71\,l_1$ for females. If the life table radix is 1, then the ration $1/L_0$ applied to infants of each sex serves to estimate births over the preceding year. This figure is always conservative, for in years of under-registration infant mortality was not fully reported.

52:Barclay S-5 (nodate)1954 AD1 Formosa AD1

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Insofar as any actual change can be detected from the ratios before 1930—and this was very slight—it was not downward. The situation after 1930 is less clear. There is little to be gained by augmenting the materials used so far with observations for single years, for yearly fertility ratios indicate fluctuation as well as trend. There were two high points, in 1935 and 1937, after which they fell slightly until 1943.

Since fertility had remained high enough up to this time to maintain an accelerating rate of growth in population, it is of special interest to see whether we have observed after 1935 merely a wavering in its upward course or the portent of actual decline. Unfortunately, the figures presented in Table 75 are the total of direct knowledge about the problem that is at present available outside of Taiwan. They cannot be verified, nor investigated in further detail, nor disproved on the basis of other data now at hand. They cannot even be examined for differences between civil divisions, for such data too are lacking after 1935.

The trends of the 1930's can be given closer scrutiny, however, by recourse to indirect procedures. Using supplemental data from Japan, it is possible to make a closer comparison of points within the census period by means of gross reproduction rates.[9] With the allowance that these make for varying age composition among the women in reproductive ages, fertility in 1940 appears to have been just slightly less than in 1935, and less *in both years* than in 1930.[10] General fertility ratios followed their peculiar course during the 1930's primarily because a large group of women were passing through their ages of greatest childbirth in the middle portion of the decade. The rise and fall of general fertility ratios after 1930 therefore indicated nothing but the unusual concentration of potential mothers: with-

[9] As employed here, the gross reproduction rate is no more than a procedure of age standardization for women. It is the sum of the age-specific fertility rates of women at all the reproductive ages 15-49, representing the average number of female births produced by one woman passed through all of these ages and exposed successively to all of these rates.

As we have remarked, births were not published in Taiwan by age of mother. Age-specific schedules of births have therefore been borrowed from Japan in 1930 as a way of estimating the distribution of births among women of different ages. Taking the age-specific rates associated with general fertility ratios that most closely fit those of Taiwan, we have used them to distribute a given number of total births among enumerated women by age. The total number of births that occurred is not altered by this procedure, but expected age differences in fertility are weighted by the number of women in each age. Cf. Taeuber, I. B., and Notestein, F. W. (1947), p. 15, where the original age-specific schedules are discussed.

[10] Actually, all three of these figures are based on 3-year averages of births centered around 1930, 1935, and 1940 respectively, with an allowance for under-registration.

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163 out this fortuitous circumstance, the fertility ratios would have shown the same trend as the reproduction rates in Table 76.

TABLE 76
GROSS REPRODUCTION RATES FOR TAIWANESE, 1905-1940*

1905	2.93
1915	3.07
1920	3.00
1930	3.39
1935	3.31
1940	3.26

* Computed through the use of age schedules of fertility substituted from Japan in 1930. The number of births occurring in 1905, 1915 and 1920 was assumed to be the number of infants counted in each census plus those who had died since birth (according to infant death rates of the given calendar year). Rates for 1930, 1935, and 1940 are based on the average yearly number of registered births during 3-year periods centered on each census year, plus a slight allowance for under-registration.

These reproduction rates seem to be the closest approximation to the "true" fertility trend of Taiwanese women that is possible. It apparently increased between 1920 and 1930, though one must bear in mind that the procedure for estimating births in 1920 differed from that in later years.[11] On surer ground, fertility probably was declining very slightly from 1930 into the period of World War II. But if fertility did change at all, it changed very little, and at the end of Japanese rule in Taiwan was at practically the same level as at the beginning.

Taiwan and Selected Other Countries

A comparison with other countries gives a better idea of how high this level was. Because of the difficulties alluded to in measuring fertility, we shall again resort to gross reproduction rates as a standard form for this purpose.

Gross reproduction rates in Taiwan ranked among the highest recorded for any population in the world. Japan and Korea, for example, were the closest parallel cases. Both are Asian countries with large segments of rural population, who in the past had adjusted their livelihood and reproduction to conditions similar to those

[11] The difference was such that it might give false testimony about the trend. Since births were estimated from infants enumerated in the census, too low a value for infant mortality would give too low a figure for births. Moreover, the calendar year 1920 may have deviated from a "true" trend, for it was a year of unusual sickness in the population, which may have reduced the number of births.

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TABLE 77
GROSS REPRODUCTION RATES
For Selected Countries

Korea*	
1935	3.38
Japan†	
Total Country	
1920	2.66
1930	2.40
1940	2.06
Hokkaido Province	
1920	3.32
1930	2.95
1940	2.35
Aomori Province	
1920	3.39
1930	3.05
1940	2.44
Chinese in Malaya‡	
1947	3.25-3.37
Rumania§	
1930-31	2.38
Palestine Moslems¶	
1935	3.57

* *Population Index* (1944), p. 239.
† Taeuber, I. B., and Notestein, F. W. (1947), p. 18.
‡ Smith, T. E. (1950), p. 73; based on two alternative estimates.
§ *Population Index* (1950), p. 175.
¶ *Ibid.*, p. 177.

confronting most Taiwanese. Korea stands somewhere between Japan and Taiwan in the agrarian condition of its people, but closer to Taiwan. Only there did reproduction rates exceed those of the Taiwanese. In Japan, during recent decades large groups of people had been drawn into a rapid process of industrial development, and had begun to pay overt attention to restricting the numbers of their children. There, to find reproduction rates for provinces as high as the averages of all Taiwanese, one must go to the "backward" frontier provinces of Hokkaido and Aomori, and go back in time to the years 1920 and 1925. Even in these areas, which were extreme in relation to the rest of Japan, gross reproduction rates became lower by 1930 than the ones we have found for all of Taiwan.[12]

[12] See Taeuber, I. B., and Notestein, F. W. (1947), p. 18.

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• 163 Estimated reproduction rates for Chinese in Malaya are included in Table 77. They furnish a useful illustration of Chinese living outside of their own country. They are also outside the scope of the Japanese system of population statistics, and any possible bias that might be imputed to it. The range of the estimate brings it near to the level that we have found in Taiwan. This is a somewhat exceptional case, for almost half of the Chinese in Malaya in 1947 were living in towns and cities, and were engaged in non-agricultural pursuits. In their fertility they still resembled Taiwanese; their gross reproduction rates were higher than the agricultural Malaysians.[13]

Presumably fertility of this level is not actually uncommon in the world, but has existed without benefit of statistics to reveal the fact. One cannot find reproduction rates of this magnitude in recent years anywhere in Europe outside the Soviet Union. For comparable cases on a national scale it is necessary to go back to the turn of the century. In short, reproduction rates such as those of the Taiwanese have almost ceased to be characteristics of the nations that maintain adequate statistics.

The Spatial Pattern of Fertility in Taiwan

If the fertility of Taiwanese was so high and if it had scarcely changed over time, it becomes important to know whether it remained the same everywhere in the island. Familial traditions drawn from China being what they were, it would be surprising if differences had been widespread before Japanese occupation. Previous chapters have shown that only selected portions of the population came into direct contact with the new influences generated by Japanese administration. Consequently one should not expect that any large number of Taiwanese had been led to change their reproductive behavior as a result. The mode of selection and the extent of participation by Taiwanese in non-traditional activities, however, did touch some groups more than others. The question that remains to be decided is whether these factors were sufficient to induce any appreciable portions of the population to depart from their accustomed levels of fertility.

The same advantage of gross reproduction rates for international comparison also makes them useful for examining different portions of the same population—they make allowance for inequalities of age distribution in different groups of women. The only groups of

[13] See Smith, T. E. (1950), pp. 48-52; 73.

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Taiwanese for which births can be matched to parents are those counted in each civil division at census dates. Migration was small, and so it happens that age differences between civil divisions were not large. Such elaborate indicators would not be needed were it not for the fact that differences in fertility were likewise small, and require sensitive tests to be discriminated at all (see Fig. 32).

These measures do reveal that average fertility was not identical as between the main sections of the island (see Table 78). By Prefecture, reproduction rates varied from high to low in somewhat the same spatial arrangement as mortality. Northern Taiwanese had lower fertility on the whole than those in the south. These differences, which were consistent from 1930 to 1935, appear to have been present for many years.[14]

A clue to the source of this variation is given by the fertility of Taiwanese in cities. Reproduction rates for cities in Table 78 were also consistent from 1930 to 1935—consistent both in relation to each other and in relation to the surrounding countryside. The differences were most extreme for cities as compared with the remainder. In a rural region, a city is a center of most activities that differ from those of its hinterland. Since urban boundaries are arbitrarily defined, it is easy to presume that the lower reproduction rates in some Prefectures had their roots in cities and spread out to the surrounding population. The presumption holds true only in part. Taipei and Chilung, for example, are bordered by an area that shared many of the activities distinguishing the city populations as more "urban" than the rest. But the other cities were less like their bordering Districts, even though they tended to differ still more from Districts of other Prefectures (see Fig. 32).

It is important to find that Taiwanese women in some cities tended to be less fertile than those in rural Districts, for our treatment of migration showed that the cities were centers of Japanese influence in the population. It appeared that this influence was not the same in all cities; hence there is no reason to suppose that its effect on fertility should be identical everywhere. But the differences within the group of nine cities in 1935 *exceeded* the variation between Prefectures. Gross reproduction rates for Taiwanese in Kaohsiung City—one of the most rapidly developing urban centers of the island—actually were very slightly higher than the average of those who

[14] Provisional estimates of fertility in 1905 have some trace of the same pattern. They are less precise and less reliable than these, however, due to the difficulty in determining the levels of births and infant mortality in this early period.

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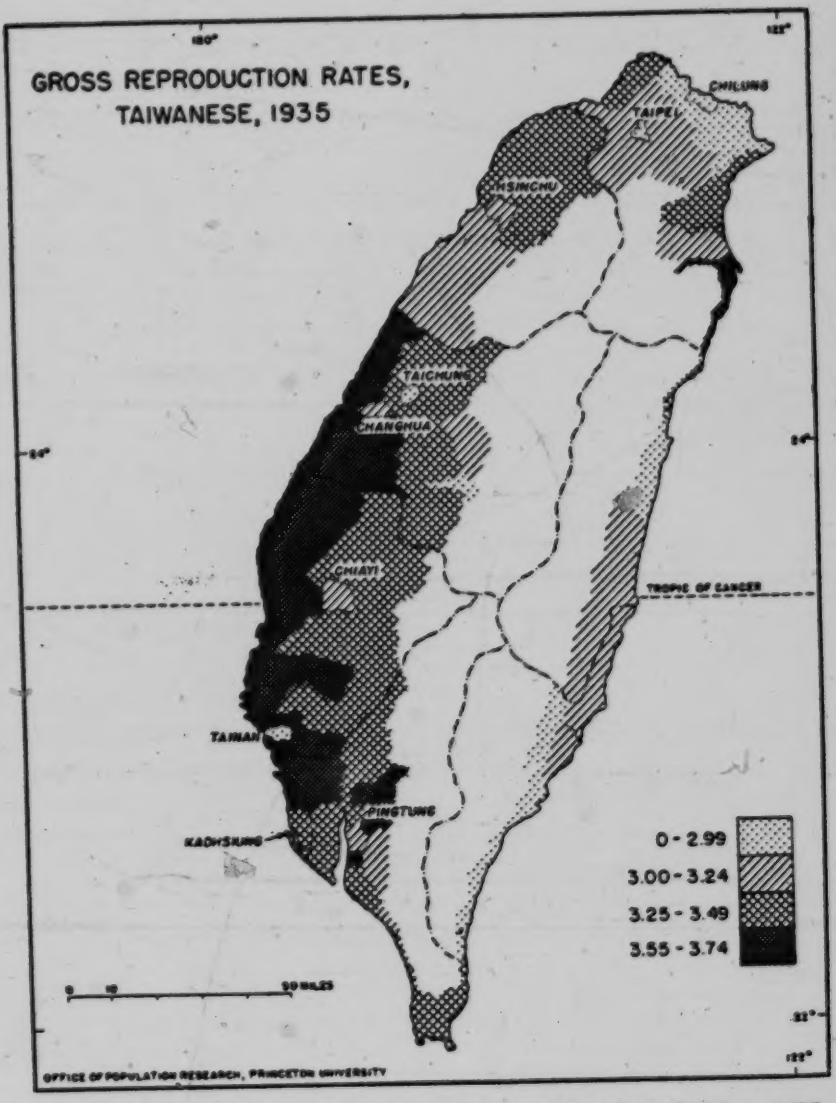

Fig. 32. Gross Reproduction Rates of Taiwanese, by Civil Division, 1935. Aborigine Territory is excluded.

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TABLE 78

TAIWAN. GROSS REPRODUCTION RATES, 1930 AND 1935
Prefectures, Major Cities, and Prefectures Outside Cities

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Prefecture	1930 Total Pref.	1930 Inside Cities	1930 Outside Cities	1935 Total Pref.	1935 Inside Cities	1935 Outside Cities	(City)
Taipei	3.12		3.24	2.99		3.10	
		2.78			2.69		(Taipei)
		2.76			2.76		(Chilung)
Hsinchu	3.34		3.35	3.23		3.24	
		3.13			3.05		(Hsinchu)
Taichung	3.56		3.57	3.39		3.42	
		3.17			2.93		(Taichung)
		—			3.16		(Changhua)
Tainan	3.59		3.66	3.44		3.51	
		3.04			2.90		(Tainan)
		3.19			3.06		(Chiayi)
Kaohsiung	3.39		3.39	3.39		3.36	
		3.40			3.40		(Kaohsiung)
		—			3.16		(Pingtung)
Taitung	2.83			2.97			
Hualien	3.27			3.06			
Total Island	3.39			3.31			

Source: Based on census tables of Taiwanese population by age, registered births, and fertility schedules substituted from Japan, 1930.

lived outside in the same Prefecture. The range of variation between cities was also greater than between Prefectures. It nearly coincided with the range over all of the rural Districts, if the small settlements on the east coast are excluded.[15]

But we are really interested in variation among individuals or non-territorial groups of individuals. In an agrarian society it is probably more inefficient than elsewhere to use civil divisions as units of observation for this purpose. One of the principal features of agrarian social organization is that localities are as far as possible self-sufficient.

[15] It is difficult to compare these with fertility over the rest of the island. Registration of births was less complete, and fertility estimates were based on smaller numbers of cases. Since these reproduction rates are a complicated type of ratio, it is impractical to estimate the random error to be expected when cases become few. It seems best not to consider these observations as being equally reliable with the remainder.

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•163 When this is the case, grouped differences in activities tend to be distributed in much the same way within the various geographical units. The same should follow for the motives and interests that one might expect to find associated with substantial differences in fertility. If, for example, wives of rural gentry were more or less fertile than those of rural peasants (and there is no evidence on either side of this question), the fact that most gentry subsisted as landowners in rural villages and towns would in every case conceal the variation in the average of each civil division observed.

The case is identical with all other types of activities that are organized with the same local scope. Since we know that very few people migrated from one part of the island to another, and not many people changed their type of employment, such sources of variation apparently were contained within the boundaries of Districts. For this reason, it has not been possible to find any evidence of association between fertility and other recorded types of behavior of rural Taiwanese by Districts. It is not a fault of the statistics, but a characteristic of the society.

This diagnosis explains why fertility is not observed to have varied with other characteristics of Taiwanese over the various rural sections of the island, but it leaves two other questions unsettled. First, the strongest spatial pattern of fertility was the sectional one, viewed in prefectural units. This is surprising to find, especially since Taiwan is small in size and new in its settlement, and Taiwanese displayed little variation in demographic characteristics among Prefectures. One would not expect to find "regional" differences, which would most likely stem from long tradition and established usage. Yet this pattern was present, and lacks any apparent reason to explain it.[16]

Second, if the social structure of most rural localities was homogeneous because they were agrarian, that of cities ought not to be, since they were responsible for the greatest differences in economic and related activities over the island. Yet fertility of Taiwanese in the major cities in no instance fell outside the range established by

[16] Conceivably it could reflect traditional practices brought over from the mainland with the original migrants and preserved intact in local villages, though there is no evidence on this point. It appears not to have been related with the one outstanding difference by place of origin, however; in 1920 general fertility ratios of descendants of Fukien Chinese and Kwangtung Chinese were substantially the same. There remain the possible "factors" of climate and different types of agriculture, which did vary more or less with the sectional pattern of fertility. But knowing these is not of much help, for they supply no reason why fertility actually should have varied.

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rural Districts, though each city tended to have somewhat lower rates than the whole of the Prefecture to which it belonged. The diagnosis above thus seems inadequate in two respects: it fails to account for the broad sectional differences in fertility that existed, and by implication it accounts for differences between city and countryside that did not exist.

Those differences that can be found in fertility do not appear to be coupled with other known features that are thought to affect the motives of reproduction. Reproduction rates showed no consistent patterns of association with the different kinds of livelihood prevailing in civil divisions, with the standing of the various places with respect to migration, or with the extent to which most localities had felt Japanese influence. Over the island as a whole, the case was the same where marriage is concerned—it is not possible to explain the variation that existed in fertility by saying that it reflected differences in the desire or opportunities of women to marry.

In Taipei City, however, it does appear that conditions preventing women from being married may have offered some interference with their childbearing. Many of its women avoided marriage and abstained from remarriage, and gross reproduction rates there were the lowest of all Districts or cities. As between the separate "wards" of the city, ratios of children to women (an alternative measurement of fertility) were closely related to the proportions of Taiwanese women who were married: those wards with more of their young adult women married had higher ratios, and the ratios where there were many unmarried women were lower. Taipei's low fertility might even be said to have depended on preventing potential mothers from marrying, for those who did marry exceeded the rural women of the same Prefecture in childbearing—the gross reproduction rate for *married* women in Taipei City was very slightly higher than that for the remainder of the Prefecture in 1935. Lower fertility, *where found*, was hence not a matter of fewer children among the married, but of absence of children among those who did not marry.

But though this conclusion seems to fit, since the Taiwanese were not yet subject to the better-known pressures for raising small families, it is not sufficient to establish a general rule for the rest of Taiwan or for Chinese people living elsewhere. In other parts of Taiwan lower birth rates were not often to be found. Other cities, for example, did not lose in distinctness from their respective Prefectures when the reproduction rates of their married women are

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compared. Basing these fertility rates on married instead of total women makes very little difference in the way they are distributed, and practically none in the observed trend of fertility, for the ages in which marriage patterns changed were not the ages in which women made their large contributions to fertility. Insofar as the factor of marriage did make a difference it seems to have cancelled out some of the variation that can be observed, but not enough of it to alter the relative standing of most civil divisions in their fertility.

Viewed in relation to other peoples who have come to restrict their fertility under modern conditions, however, the whole range of variation among Taiwanese by civil divisions seems trivial. The very lowest of "urban" gross reproduction rates, in Taipei City, corresponds to very high fertility in most other countries. In Japan, even in 1935 more than half of the provinces *outside* the principal cities had lower rates than this. There is no way to determine, then, whether or not the observed differences in Taiwan might have presaged further declines in the segments of Taiwanese that were exposed to outside influence. But two things are certain: such a decline had not proceeded very far, and its progress was extremely slow. It may have been nothing more than a continuation of differences that existed before the arrival of Japanese in Taiwan.